

REMARKS

This is in full and timely response to the Office Action mailed June 5, 2003. Reexamination and reconsideration in light of the above amendments and the following remarks is respectfully requested.

By the foregoing amendment, claim 6 was cancelled without prejudice or disclaimer, and claims 1, 5, 7, 9, 10, 12 and 24 were amended. Claim 1 was amended to incorporate the elements of the conductive film being made of copper, and that a path for transferring the substrate between the transferring mechanism under a reduced pressure and a location outside the apparatus under an atmospheric pressure without passing through the drying chamber. Support for this amendment can be found variously throughout the specification, for example, Fig. 1 and page 8, line 1 to page 10, line 20. Claim 5 was amended to incorporate the elements of the conductive film being made of copper. Claims 7 and 24 were amended to correct for dependency. Claim 9 was amended to incorporate the elements of the conductive film being made of copper, and to add that the cleaning and drying of the polished substrate is at a first position located in a first path, that the substrate is transferred to a second position through the first path, and that the substrate is transferred under the reduced pressure to a location outside the apparatus under an atmospheric pressure through a second path different from the first path. Support for this amendment can be found variously throughout the specification, for example, Fig. 1. Claim 10 was amended to incorporate the elements of the conductive film being made of copper. Claim 12 was amended to recite that the first delivering and receiving portion have a first path for transferring the substrate, that the second delivering and receiving portion have a second path for transferring the substrate, and that the substrate to be processed with the vacuum type processing between the first substrate carrier and the first substrate processing portion without passing through the second substrate processing portion. Support for this amendment can be found variously throughout the specification, for example, Fig. 1. No prohibited new matter was added. Claims 1, 5, 7-10, 12-18 and 23-25 are currently pending for the Examiner's reconsideration, with claims 1, 9 and 12 being independent.

Rejections under 35 U.S.C. §103

Claims 1, 9, 23 and 25 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,110,011 to Somekh et al. in view of U.S. Patent No. 5,303,671 to Kondo et al. Applicants respectfully traverse this rejection.

Claim 1 recites an apparatus, comprising: a polishing chamber for polishing a conductive film made of copper which is formed on a substrate; a cleaning chamber cleaning the polished substrate polished in the polishing chamber; at least one drying chamber, having a first transferring port and a second transferring port, for drying the cleaned substrate transferred from the cleaning chamber through the first transferring port under a reduced pressure; a film forming chamber forming a thin film on the substrate by a CVD method under the reduced pressure; a transferring mechanism for receiving the dried substrate from the drying chamber through the second transferring port and for transferring the received substrate to the film forming chamber under the reduced pressure; and a path for transferring the substrate between the transferring mechanism under the reduced pressure and a location outside the apparatus under an atmospheric pressure without passing through the drying chamber.

Claim 9 recites a film forming method, comprising the steps of: polishing a conductive film made of copper which is formed on a substrate; cleaning and drying the polished substrate under a reduced pressure at a first position located in a first path, where the substrate is cleaned and dried ; transferring the substrate to a second position for forming a thin film by a CVD method performed under a reduced pressure through the first path and forming the thin film at the second position while maintaining the reduced-pressure state; and transferring the substrate under the reduced pressure to a location outside the apparatus under an atmospheric pressure through a second path different from the first path.

Somekoh, the substrate is dried in the Rinse/Clean/ Dry Station 82 before transferring the substrate from the load lock chamber under reduced pressure to the outside of the apparatus under atmospheric pressure, as clearly shown in Fig. 5 and stated at Column 6 line 37 to line 47 of the specification. Similarly, in Kondo, drying is performed before transferring the substrate to the outside of the apparatus under the atmospheric pressure as indicated in Fig.8.

In contrast, the apparatus of the present invention has, as recited in Claim 1 and Claim 23, "a path for transferring the substrate formed with a film in the CVD chamber using the CVD method to the first transferring port without passing through the drying chamber". Such structure enables to avoid a situation where one drying chamber is used in the both cases of

"drying the substrate before the formation of a film" and "drying the substrate after the formation of a film", that is, "copper atoms being adhered to the transferring mechanism in the drying chamber and then to the substrate "before the formation of a film" after being placed into the drying chamber to be dried". Copper atoms being adhered to the substrate could cause electric characteristics to be changed.

Additionally, as the examiner points out, there is no portion in Somekoh that corresponds to a "first transferring port" and a "second transferring port" in the dual load lock chamber 80. Still further, in Somekoh, drying of the substrate is performed not in the dual load lock chamber but in the "Rinse/Clean/Dry Station 82" which clearly indicates that the dual load lock chamber does not correspond to the drying unit 70 of Kondo. For this reason, Applicant asserts that it is not appropriate to combine Somekoh with Kondo to reject the present invention, even though the substrate may be carried outside of the apparatus without being dried in Somekoh.

With respect to the examiner's comments in the Office Action at paragraph 10, the examiner is reminded that ALL of the claimed elements must be disclosed, taught or suggested in the combined references in a §103 rejection. Discussing the references individually to show the lack of recited elements is proper and necessary, because if all of the claimed elements are not disclosed, taught or suggest, then de facto the combination of the references do not rise to a prima facie level of obviousness.

Accordingly, neither Somekh et. al. '011 nor Kondo et al. '671 disclose, teach or suggest the recited claim elements, either alone or in combination. Accordingly, a prima facie case of obviousness has not been established. Withdrawal of this rejection is respectfully requested.

Dependent claims 23 and 25, being dependent upon allowable claim 1, are also allowable for the reasons above. Moreover, these claims are further distinguished by the additional features recited therein, particularly within the claim combination.

Accordingly, withdrawal of the §103 rejections is respectfully requested.

Claims 5-7 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,110,011 to Somekh et al. in view of U.S. Patent No. 5,303,671 to Kondo et al., and further in view of Japanese Patent Publication No. 01-183299 to Hashimoto. Applicants respectfully traverse this rejection.

Dependent claims 5-7, being dependent upon allowable claim 1, and claims 10, being dependent upon allowable claim 9, are also allowable for the reasons above. Moreover, these claims are further distinguished by the additional features recited therein, particularly within the claim combination.

Accordingly, withdrawal of the §103 rejections is respectfully requested.

Claims 8 and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,110,011 to Somekh et al. in view of U.S. Patent No. 5,303,671 to Kondo et al., and Japanese Patent Publication No. 07-183299 to Hashimoto, and further in view of U.S. Patent No. 5,518,542 to Matsukawa et al. Applicants respectfully traverse this rejection.

Dependent claims 8, being dependent upon allowable claims 1 and 7, and claims 10, being dependent upon allowable claim 9, are also allowable for the reasons above. Moreover, these claims are further distinguished by the additional features recited therein, particularly within the claim combination.

Accordingly, withdrawal of the §103 rejections is respectfully requested.

Claims 12, 13 and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,110,011 to Somekh et al. in view of U.S. Patent No. 5,303,671 to Kondo et al., and further in view of U.S. Patent 5,855,726 to Soraoka et al. Applicants respectfully traverse this rejection.

Claim 12 recites an apparatus, comprising: a first substrate carrier for transferring a substrate in an atmospheric air; a first substrate processing portion performing a vacuum type processing on the substrate; a second substrate processing portion performing a solution type processing on the substrate; a first delivering and receiving portion having a first path for transferring the substrate to be processed with the solution type processing between the second substrate processing portion and the first substrate processing portion; and a second delivering and receiving portion having a second path for transferring the substrate ~~not~~ to be processed with the vacuum type processing between the first substrate carrier and the first substrate processing portion without passing through the second substrate processing portion.

The Office Action acknowledges that Soraoka et al. '726 disclose "a first substrate

carrier" for transferring a substrate in an atmospheric air" and "a second delivering and receiving portion for transferring the substrate to be processed with the vacuum type processing".

In contrast, the present invention has two delivering portions of "a first delivering and receiving portion delivering and receiving the substrate to be processed with the solution type processing" and "a second delivering and receiving portion for transferring the substrate to be processed with the vacuum type processing without passing through the second substrate processing portion". With this structure, the substrate formed with a film using CVD method can be transferred through the second transferring path, without contacting the first transferring path provided for the substrate treated with solution type processing. Applicant asserts that none of the citations Somekoh, Kondo and Soraoka, either alone or in combination, disclose, teach or suggest that the transferring path of the substrate after the solution type processing being performed thereon is different from the transferring path of the substrate after the vacuum type processing being performed thereon. With such structure, the contamination of the transferring path caused by transferring the substrate after a film forming by CVD method can be prevented.

Accordingly, a prima facie case of obviousness has not been established. Withdrawal of this rejection is respectfully requested.

Dependent claims 13 and 16, being dependent upon allowable claim 12, are also allowable for the reasons above. Moreover, these claims are further distinguished by the additional features recited therein, particularly within the claim combination.

Accordingly, withdrawal of the §103 rejections is respectfully requested.

Claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,110,011 to Somekh et al. in view of U.S. Patent No. 5,303,671 to Kondo et al. and in view of U.S. Patent 5,855,726 to Soraoka et al., and further in view of U.S. Patent No. 6,153,524 to Henley et al. Applicants respectfully traverse this rejection.

Dependent claim 14, being dependent upon allowable claim 12, is also allowable for the reasons above. Moreover, this claim is further distinguished by the additional features recited therein, particularly within the claim combination.

Accordingly, withdrawal of the §103 rejections is respectfully requested.

Claim 15 is rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,110,011 to Somekh et al. in view of U.S. Patent No. 5,303,671 to Kondo et al. and in view of U.S. Patent 5,855,726 to Soraoka et al., and further in view of U.S. Patent No. 5,672,239 to DeOrnellas. Applicants respectfully traverse this rejection.

Dependent claim 15, being dependent upon allowable claim 12, is also allowable for the reasons above. Moreover, this claim is further distinguished by the additional features recited therein, particularly within the claim combination.

Accordingly, withdrawal of the §103 rejections is respectfully requested.

Claims 17 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,110,011 to Somekh et al. in view of U.S. Patent No. 5,303,671 to Kondo et al. and in view of U.S. Patent 5,855,726 to Soraoka et al., and further in view of U.S. Patent No. 5,518,542 to Matsuskawa et al. Applicants respectfully traverse this rejection.

Dependent claims 17 and 18, being dependent upon allowable claim 12, are also allowable for the reasons above. Moreover, these claims are further distinguished by the additional features recited therein, particularly within the claim combination.

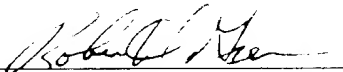
Accordingly, withdrawal of the §103 rejections is respectfully requested.

Conclusion

For the foregoing reasons, claims 1, 5, 7-10, 12-18 and 23-25 are in condition for allowance. Accordingly, favorable reexamination and reconsideration of the application in light of these amendments and remarks is courteously solicited. If the examiner has any comments or suggestions that would place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number below.

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Respectfully submitted,

By 

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